

Integrated PEMFC Flow Field Design Concept for Gravity Independent Passive Water Removal, Phase II

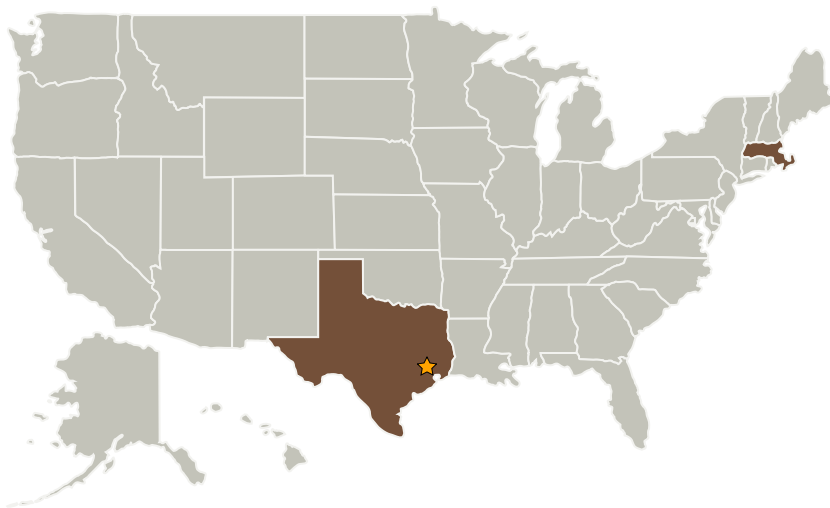
Completed Technology Project (2006 - 2008)



Project Introduction

ElectroChem proposes a Phase II program to advance its very successful SBIR Phase I PEM fuel cell (PEMFC) program. In Phase I, the unique integrated-flow-field design (IFF) has been shown to provide highly superior passive water management that results in a H₂/O₂ PEMFC that is gravity independent, achieves higher voltage efficiencies than conventional PEMFC designs, can be operated safely at high pressure (with resulting higher efficiencies), will enable passive operation, and requires extremely low excess O₂ to maintain stable operation. The Phase II Program will bring ElectroChem's IFF PEMFC concept to the threshold of commercialization. In Phase II, scale-up and IFF optimization will be carried out. For complete passive operation, stack systems will incorporate an ejector to produce the low reactant flows and for product water removal. High performance membrane electrode assemblies (MEAs) will be developed. These Ph II efforts will produce a 250W IFF stack deliverable that will be integrated directly into NASA's Exploration Energy Storage Plan. The use of the IFF innovation will significantly simplify PEMFC operation and will result in higher and safer performance. Specifically, for space applications, the higher voltage efficiencies produced and the lower excess O₂ required by the IFF will result in significantly lower fuel cell power plant weight.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
ElectroChem, Inc.	Supporting Organization	Industry Minority-Owned Business, Women-Owned Small Business (WOSB)	Woburn, Massachusetts

Primary U.S. Work Locations

Massachusetts	Texas
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.2 Distribution and Transmission